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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,307	02/26/2004	Ye-Yong Kim	IK-0072	3458
34610	7590	04/13/2006	EXAMINER	
FLESHNER & KIM, LLP P.O. BOX 221200 CHANTILLY, VA 20153			CHANDRAN, BIJU INDIRA	
			ART UNIT	PAPER NUMBER
			2835	

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/786,307	<b>Applicant(s)</b> KIM ET AL.	
	<b>Examiner</b> Biju Chandran	<b>Art Unit</b> 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-12 and 14-24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-12,14,15 and 24 is/are allowed.
- 6) ☒ Claim(s) 1,3,5-7 and 16-22 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant claims a 'liquid phase transition block' in claim 1 without pointing this element out in the specification or the drawings.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3, 5 - 7, and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bookhardt et al. (US 6,328,097 B1).

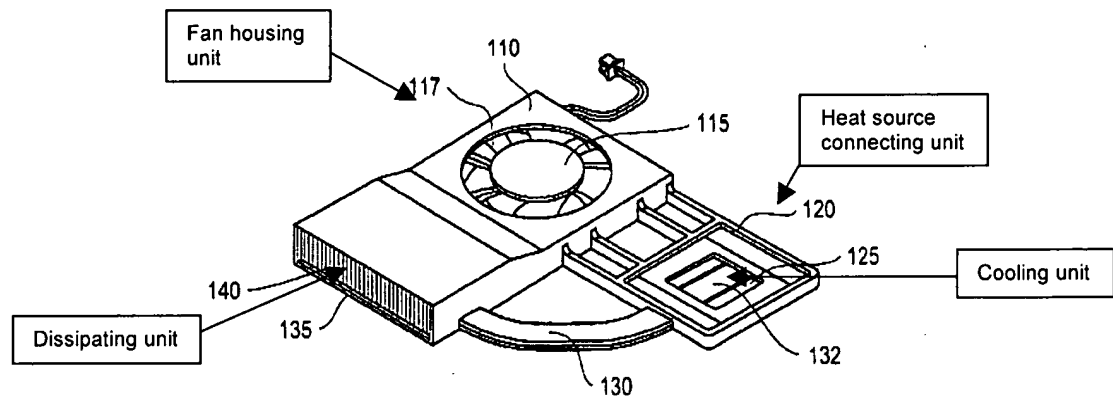
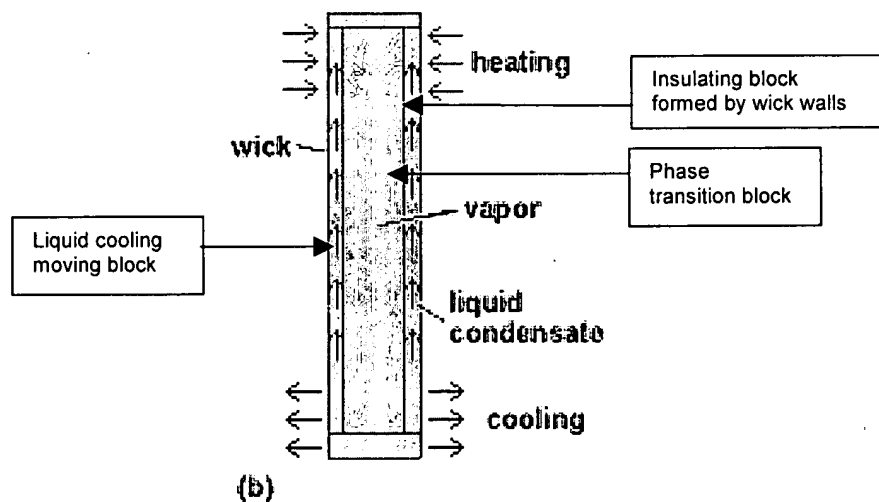


FIG. 1A

- Regarding claim 1, Bookhardt et al. disclose a cooling system for a portable computer comprising a frame having a heat-source connecting unit contained within a first side and having a fan housing unit in a second side; a dissipating unit on one side of the fan housing unit of the frame that is configured to perform heat exchange; a dissipating fan (115) within the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and a cooling unit coupled to the first side of the frame and configured to deliver heat from the heat-source connecting unit to the dissipating unit (column 2, lines 43-49). Bookhardt et al. do not explicitly mention that the cooling unit is configured to perform heat exchange using a cooling cycle caused by phase change and that the micro cooling unit has an internal circulation loop that comprises a liquid cooling moving -block configured to return coolant to a beginning of a liquid phase transition block-from an end of the liquid phase

transition block, and an insulation block between the liquid phase transition block and liquid coolant moving block. However, Bookhardt et al. identifies the cooling unit to be a heat pipe. It would have been obvious to one of ordinary skill in the art at the time of the invention that the heat pipe operates by phase change of a coolant and has an internal circulation loop (as shown in Figure b of David A. Reay, Heat Pipe, in AccessScience@McGraw-Hill, <http://www.accessscience.com>, DOI 10.1036/1097-8542.757297, May 13, 2002; and Figure 2.42, Charles A. Harper, Cooling with Heat Pipes, Page 2.79, Electronic packaging & Interconnection Handbook, Mc-Graw Hill, 1997)



that comprises a liquid cooling moving -block configured to return coolant to a beginning of a liquid phase transition block-from an end of the liquid phase transition block, and an insulating block (see description of the 'wick' in lines 2-3 of the Principles of Operation, Cooling with Heat Pipes, Page 2.79, Electronic packaging &

Interconnection Handbook) between the liquid phase transition block and liquid coolant moving block.

- Regarding claim 16, Bookhardt et al. disclose a cooling system for a portable computer comprising a frame having a heat-source connecting unit in a first side and having a fan housing unit in a second side, wherein the frame forms a bottom surface and sides of the fan housing unit; a dissipating unit on one side of the fan housing unit of the frame that is configured to perform heat exchange; a dissipating fan with the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and a plate-heat pipe coupled to one side of the frame to form the top surface of the fan housing unit (figure 1B), wherein the plate-heat pipe is configured to contact a heat source to deliver heat to the dissipating unit by circulating a fluid through its inside.
- Regarding claim 3, Bookhardt et al. further discloses that the cooling unit is a plate heat pipe that covers one side of the frame.
- Regarding claim 5, Bookhardt et al. do not explicitly disclose the thickness of the heat pipe. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the heat pipe 1mm thick or any other thickness by routine experimentation for optimal performance.

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- Regarding claim 6, Bookhardt et al, further disclose that the heat source connecting unit is configured to thermally couple to a main board, and wherein when the frame is removed a processor mounted on the main board is exposed (see figure 1B).
- Regarding claim 7, Bookhardt et al, further disclose that the frame and the cooling unit provide two heat removing paths to the dissipating unit.
- Regarding claim 17, Bookhardt et al. further disclose that the heat source connecting unit is configured to transfer heat from the heat source through the frame to the dissipating unit (see figure 1A and 1B).
- Regarding claim 18, Bookhardt et al. further disclose that the dissipating fan assembly is installed in a space partitioned by the fan housing unit and the plate-heat pipe and forms an air stream that collides against the plate-heat pipe and then the dissipating unit (see fig 1A and 1B).
- Regarding claim 19, Bookhardt et al. further disclose that the frame is fastened to a main board in the portable computer (column 1, line 39), wherein the dissipating unit is thermally coupled to a processor in the main board (column 2, lines 60-67), and wherein the frame and the plate-heat pipe are configured to provide access to the processor (figure 1B).
- Regarding claim 20, Bookhardt et al. does not disclose the thickness of the heat pipe. However, it would have been obvious to one of ordinary

skill in the art at the time of the invention to make the heat pipe 1.5 mm thick or any other thickness by routine experimentation for optimal performance.

- Regarding claim 21, Bookhardt et al. disclose a cooling system for a portable computer comprising: a frame having a recess (125) in a first side and having a fan housing unit in a second side; a micro cooling system having a first side configured with a heat releasing part (column 2, line 65-66) contained within the frame by the recess and a second opposite side configured to include a heat absorption part, wherein the micro cooling system is configured to perform heat exchange by repeating a cooling cycle of condensation and evaporation using a capillary phenomenon to transfer heat arising from the processor (see 'Operating Principle', David A. Reay, Heat Pipe, in AccessScience@McGraw-Hill, <http://www.accessscience.com>, DOI 10.1036/1097-8542.757297, May 13, 2002; and 'Principles of Operation' section, Charles A. Harper, Cooling with Heat Pipes, Page 2.79, Electronic packaging & Interconnection Handbook, Mc-Graw Hill, 1997), a dissipating unit (marked in the attached figure) on one side of the fan housing unit of the frame that is configured to perform heat exchange; a dissipating fan with the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and a plate-heat pipe on one side of the



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frame and configured to deliver heat from the frame to the dissipating unit by circulating a fluid through its inside.

- Regarding claim 22, Bookhardt et al. further disclose that the micro cooling unit has first and second layers having different characteristics (the case of the heat pipe is the first layer, the mesh within it is another layer, and the liquid within it is yet another layer. Due to the differences in material properties and/or structure, these layers have different characteristics).

### ***Allowable Subject Matter***

Claim 23 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 8-12, 14, 15 and 24 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art does not disclose a micro-cooling system as described in claim 8 with a liquid coolant storage block, an evaporation block having first size channels coupled to the liquid coolant storage block, a gaseous coolant moving block coupled to the evaporation block, and a condensation block having second channels which are larger than the first channels coupled to the gaseous coolant moving block.

***Response to Arguments***

Applicant's arguments with respect to all claims have been considered but are moot in view of the amendments and subsequent new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

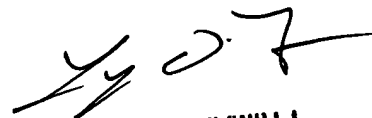
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Biju Chandran whose telephone number is (571) 272-5953. The examiner can normally be reached on 8AM - 5PM. Mon-Fri.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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LYNN D. FEILD  
PRIMARY EXAMINER